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IS 12836 (1989): 36-Nickel Iron Soft Magnetic Rods [MTD 16: Alloy Steels and Forgings]

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Indian Standard

36-NICKEL IRON SOFT MAGNETIC RODS — SPECIFICATION

भारतीय मानक

36-निकल लौह मृदु चुम्बकीय छड़ – विशिष्टि

UDC 669·15' 24 - 198 - 422

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1990

Price Group 1

Special Metals and Alloys Sectional Committee, MTD 27

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 20 November 1989, after the draft finalized by the Special Metals and Alloys Sectional Committee had been approved by the Metallurgical Engineering Division Council.

36-nickel iron soft magnetic rod is being widely used in relay cores. The requirements of 36-nickel iron soft magnetic strip and 48-nickel iron soft magnetic strip have been covered in IS 12881 : 1990 and IS 12882 : 1990 respectively.

While preparing this standard necessary assistance has been derived from Indian Telephone Industries Ltd, Bangalore.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

36-NICKEL IRON SOFT MAGNETIC RODS — SPECIFICATION

1 SCOPE

1.1 This specification covers the requirements of nickel iron rods used in relay cores.

2 REFERENCES

2.1 The Indian standards listed below are necessary adjuncts to this standard:

IS No.	*Title*
IS 228	Methods for chemical analysis of steels
IS 1387 : 1967	General requirements for the supply of metallurgical materials (*first revision*)
IS 1501 (Part 1) : 1984	Method for vickers hardness test for metallic materials: Part 1 HV 5 to HV 100 (*second revison*)

3 SUPPLY OF MATERIAL

3.1 The general requirements relating to supply of this material shall conform to IS 1387 : 1967.

3.2 Rods shall be supplied in the form of cut lengths.

4 MANUFACTURE

4.1 The choice of manufacturing process is left to the supplier.

5 CHEMICAL COMPOSITION

5.1 The product analysis of the material when carried out either by the methods specified in relevant part of IS 228 or any other established instrumental/chemical method shall be as given in Table 1. The chemical composition is for reference only as long as other requirements called for in this specification are met.

Table 1 Chemical Composition

(*Clause* 5.1)

Element	Percent	
	Min	*Max*
Nickel	36·0	38·0
Carbon	—	0·075
Manganese	—	0·70
Other impurities	—	0·01
Iron	Remainder	

6 FINISH

6.1 Rods up to 12 mm shall be supplied in the bright cold drawn condition and above 12 mm it shall be hot rolled annealed and centreless ground to a smooth finish.

7 FREEDOM FROM DEFECTS

7.1 The material shall be uniform in composition, sound, homogeneous and free from physical defect or flaw both externally and internally.

8 HARDNESS

8.1 The hardness of the material shall be between 130 to 180 HV when tested as per IS 1501 (Part 1) : 1984.

9 MAGNETIC PROPERTIES

9.1 After annealing as per manufacturers recommendations or at a temperature of 1100°C to 1150°C in a protective hydrogen atmosphere the material should meet the magnetic properties and as given in Table 2.

Table 2 Magnetic Properties

(*Clause* 9.1)

Coercive Force *Max*	Ageing* Coefficient of Coercive Force in Percentage *Max*	Minimum Values of Magnetic Flux Density Microvolts, per Square Centimetre (μ V/cm^2) for a Magnetic Field Strength (H) of					
		0·2 A/cm 0·25 Oe	0·5 A/cm 0·63 Oe	1 A/cm 1·26 Oe	3 A/cm 3·8 Oe	5 A/cm 6·3 Oe	40 A/cm 50·5 Oe
0·24 A/cm	5	20	45	70	90	100	118
0·3 Oe	—	2 000 (gauss)	4 500 (gauss)	7 000 (gauss)	9 000 (gauss)	10 000 (gauss)	11 800 (gauss)

*Increase in coercive force value, after ageing for 100 hours at 100 ± 5°C, over the previous measured value.

10 DIMENSIONAL TOLERANCES

10.1 Unless otberwise specified the rods shall conform to the following tolerance limits.

10.2 Permissible Variation on Diameter

Diameter mm	*Tolerance* ±mm
4 to up to and including 12	0·05
Above 12 up to and including 25	0·10
Above 25 up to and including 50	0·25

10.3 Permissible Variation on Length

A tolerance of ±1 percent on the length specified will be allowed. The extremities should be clean and free from burrs.

10.4 Permissible Variation on Straightness

When placed on a horizontal flat surface and loaded by their own weight only, the maximum deviation from the surface, between two points at a distance of one meter from each other should be within 1 mm.

10.5 Permissible Variation on Out of Roundness

Out of roundness is the difference between the maximum and the minimum diameters, measured at the same cross section. It shall not be more than half of the tolerance on the diameter.

11 SAMPLING FOR TESTS

11.1 One representative sample from a lot shall be taken for each test. A lot shall consist of 5 tons or less of the same quality, for the same diameter and condition. If the lot consists of more than one heat, samples from each heat shall be tested.

12 PACKING AND MARKING

12.1 Nickel iron rods of each size shall be covered with hessain and subsequently packed in wooden cases unless otherwise there is a mutual agreement between the manufacturer and the purchaser.

12.2 The wooden cases shall be indelibly marked with the manufacturers name, weight, dimensions, batch number and description of the items.

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